

General

Guideline Title

American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of glenohumeral joint osteoarthritis.

Bibliographic Source(s)

American Academy of Orthopaedic Surgeons (AAOS). American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of glenohumeral joint osteoarthritis. Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2009 Dec 4. 198 p. [31 references]

Guideline Status

This is the current release of the guideline.

The American Academy of Orthopaedic Surgeons (AAOS) reaffirmed the currency of this guideline in 2014.

Recommendations

Major Recommendations

Definitions of the strength of recommendations (Strong, Moderate, Weak, Inconclusive, and Consensus) are provided at the end of the "Major Recommendations" field.

Note from the American Academy of Orthopaedic Surgeons (AAOS): This summary does not contain rationales that explain how and why these recommendations were developed nor does it contain the evidence supporting these recommendations. All readers of this summary are strongly urged to consult the full guideline and evidence report (see "Guideline Availability" and "Availability of Companion Documents" fields) for this information. The work group is confident that those who read the full guideline and evidence report will also see that the recommendations were developed using systematic evidence-based processes designed to combat bias, enhance transparency, and promote reproducibility. This summary of recommendations is not intended to stand alone.

1. The work group is unable to recommend for or against physical therapy for the initial treatment of patients with osteoarthritis of the glenohumeral joint.
Strength of Recommendation: Inconclusive
2. The work group is unable to recommend for or against the use of pharmacotherapy in the initial treatment of patients with glenohumeral joint osteoarthritis.
Strength of Recommendation: Inconclusive
3. The work group is unable to recommend for or against the use of injectable corticosteroids when treating patients with glenohumeral joint osteoarthritis.

Strength of the Recommendation: Inconclusive

4. The use of injectable viscosupplementation is an option when treating patients with glenohumeral joint osteoarthritis.

Strength of the Recommendation: Weak

5. The work group is unable to recommend for or against the use of arthroscopic treatments for patients with glenohumeral joint osteoarthritis. These treatments include debridement, capsular release, chondroplasty, microfracture, removal of loose bodies, and biologic and interpositional grafts, subacromial decompression, distal clavicle resection, acromioclavicular joint resection, biceps tenotomy or tenodesis, and labral repair or advancement.

Strength of Recommendation: Inconclusive

6. The work group is unable to recommend for or against open debridement and/or non-prosthetic or biologic interposition arthroplasty in patients with glenohumeral joint osteoarthritis. These treatments include:

- Allograft
- Biologic and Interpositional Grafts
- Autograft

Strength of Recommendation: Inconclusive

7. Total shoulder arthroplasty and hemiarthroplasty are options when treating patients with glenohumeral joint osteoarthritis.

Strength of Recommendation: Weak

8. The work group suggests total shoulder arthroplasty over hemiarthroplasty when treating patients with glenohumeral joint osteoarthritis.

Strength of Recommendation: Moderate

9. An option for reducing immediate postoperative complication rates is for patients to avoid shoulder arthroplasty by surgeons who perform less than two shoulder arthroplasties per year.

Strength of Recommendation: Weak

10. In the absence of reliable evidence, it is the opinion of this work group that physicians use peri-operative mechanical and/or chemical VTE (venous thromboembolism) prophylaxis for shoulder arthroplasty patients.

Strength of Recommendation: Consensus

11. The use of either keeled or pegged all polyethylene cemented glenoid components are options when performing total shoulder arthroplasty.

Strength of Recommendation: Weak

12. In the absence of reliable evidence, it is the opinion of this work group that total shoulder arthroplasty not be performed in patients with glenohumeral osteoarthritis who have an irreparable rotator cuff tear.

Strength of Recommendation: Consensus

13. The work group is unable to recommend for or against biceps tenotomy or tenodesis when performing shoulder arthroplasty in patients who have glenohumeral joint osteoarthritis.

Strength of Recommendation: Inconclusive

14. The work group is unable to recommend for or against a subscapularis trans tendinous approach or a lesser tuberosity osteotomy when performing shoulder arthroplasty in patients who have glenohumeral joint osteoarthritis.

Strength of Recommendation: Inconclusive

15. The work group is unable to recommend for or against a specific type of humeral prosthetic design or method of fixation when performing shoulder arthroplasty in patients with glenohumeral joint osteoarthritis.

Strength of Recommendation: Inconclusive

16. The work group is unable to recommend for or against physical therapy following shoulder arthroplasty.

Strength of Recommendation: Inconclusive

Definitions:

Strength of Recommendation

Strength	Overall Quality of Evidence	Description of Evidence	Guideline Language
Strong	Good	Level I evidence from more than one study with consistent findings for recommending for or against the intervention or diagnostic.	The work group <i>recommends</i>
Moderate	Fair	Level II or III evidence from more than one study with consistent findings, or Level I evidence from a single study for recommending for or against the intervention or diagnostic.	The work group <i>suggests</i>
Weak	Poor	Level IV or V evidence from more than one study with consistent findings, or Level II or III evidence from a single study for recommending for against the intervention or diagnostic.	<i>option</i>
Inconclusive	None or conflicting	The evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention or diagnostic.	The work group is <i>unable to recommend for or against</i>
Consensus	No evidence	There is no supporting evidence. In the absence of reliable evidence, the work group is making a recommendation based on their clinical opinion considering the known harms and benefits associated with the treatment.	In the absence of reliable evidence, it is the <i>opinion</i> of the work group

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Osteoarthritis of the glenohumeral joint

Guideline Category

Treatment

Clinical Specialty

Family Practice

Internal Medicine

Orthopedic Surgery

Physical Medicine and Rehabilitation

Rheumatology

Sports Medicine

Intended Users

Advanced Practice Nurses

Nurses

Physical Therapists

Physician Assistants

Physicians

Guideline Objective(s)

- To help improve treatment of osteoarthritis of the glenohumeral joint based on the current best evidence
- To guide qualified physicians through a series of treatment decisions in an effort to improve the quality and efficiency of care for osteoarthritis of the glenohumeral joint
- To serve as an information resource for decision makers and developers of practice guidelines and recommendations

Target Population

Adults (19 years of age and older) with osteoarthritis of the glenohumeral joint

Interventions and Practices Considered

1. Injectable viscosupplementation
2. Total shoulder arthroplasty and hemiarthroplasty
3. Avoiding surgeons who perform less than two shoulder arthroplasties a year
4. Venous thromboembolism (VTE) prophylaxis
5. Keeled or pegged all polyethylene cemented glenoid components
6. Avoiding total shoulder arthroplasty in patients with irreparable rotator cuff tear

Note: No recommendation for or against use could be made for the following interventions: physical therapy as initial treatment; pharmacotherapy; injectable corticosteroids; arthroscopic treatments including debridement, capsular release, chondroplasty, microfracture, removal of loose bodies, and biologic and interpositional grafts, subacromial decompression, distal clavicle resection, acromioclavicular joint resection, biceps tenotomy or tenodesis, and labral repair or advancement; open debridement and/or non-prosthetic or biologic interposition arthroplasty including allograft, biologic and interpositional grafts, and autograft; trans tendinous approach or a lesser tuberosity osteotomy; a specific type of humeral prosthetic design or method of fixation; and physical therapy following shoulder arthroplasty.

Major Outcomes Considered

- Pain relief
- Functional status
- Quality of life
- Complications of operative procedures

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Study Inclusion Criteria

The work group developed *a priori* article inclusion criteria for their review. These criteria are the "rules of evidence" and articles that do not meet them are, for the purposes of this guideline, not evidence.

To be included in the systematic reviews (and hence, in this guideline) an article had to be a report of a study that:

- Evaluated a treatment for osteoarthritis of the glenohumeral joint
- Was a full report of a clinical study and was published in the peer reviewed literature
- Was an English language article published after 1965
- Was not a cadaveric, animal, *in vitro*, or biomechanical study
- Was not a retrospective case series, medical records review, meeting abstract, unpublished study report, case report, historical article, editorial, letter, or commentary
- Was the most recent report of a study or the report with the largest number of enrolled patients in a study with multiple publications
- Enrolled ≥ 10 patients in each of its study groups
- Enrolled a patient population comprised of at least 80% of patients with osteoarthritis of the glenohumeral joint
- Reports qualified results
- Enrolled less than 20% of patients with: neurologic conditions, inflammatory arthropathy, avascular necrosis (AVN), rotator cuff arthropathy, infection
- Study follow up must be at least 2 years (any surgical intervention). This criteria applies to Recommendations 5, 6, 7, 8, 11, 12, 13, 14, and 15 (see 'Major Recommendations' field)
- Must not be a revision shoulder arthroplasty

When examining primary studies the work group analyzed the best available evidence. They first considered outcomes reported in randomized controlled trials. They then sequentially searched for outcomes reported in controlled trials, prospective comparative studies, and retrospective comparative studies. Finally, they searched for prospective case-series studies. Only outcomes of the highest level of available evidence are included. For example, if there are two Level II Visual Analog Scale (VAS) Pain measures that address the recommendation, Level III, IV, or V VAS pain measures will not be included.

They included patient-oriented outcomes. As the term implies, patient-oriented outcomes are outcomes that matter to the patient. They tell clinicians, directly and without the need for extrapolation, that a diagnostic, therapeutic, or preventative procedure helps patients live longer or live better. Examples of patient-oriented outcomes include pain, function, and quality of life.

The work group also excluded some outcomes from consideration. They did not include surrogate outcomes. Surrogate outcome measures are laboratory measurements or another physical sign used as substitutes for a clinically meaningful end point that measures directly how a patient feels, functions, or survives. For a surrogate outcome to be valid it must be in the causal pathway between intervention and the outcome and it must demonstrate a large, consistently measurable association with the outcome.

Literature Searches

The work group attempted to make the searches for articles comprehensive. Using comprehensive literature searches ensures that the evidence considered for this guideline is not biased for (or against) any particular point of view.

The work group searched for articles published from January 1966 to June 2009. Strategies for searching electronic databases were constructed by the American Academy of Orthopaedic Surgeons (AAOS) Medical Librarian. The search strategies used are provided in Appendix III in the original guideline document. Six electronic databases were searched: PubMed, EMBASE, CINAHL, The Cochrane Library, The National Guideline Clearinghouse and TRIP database.

All searches of electronic databases were supplemented with manual screening of bibliographies of all retrieved publications. The work group also searched the bibliographies of recent systematic reviews and other review articles for potentially relevant citations. Finally, a list of potentially relevant studies, not identified by the searches, was provided by the work group members. Medical management of osteoarthritis is covered by extensive literature; however, these studies were not limited to glenohumeral joint osteoarthritis.

The study attrition diagram (see Appendix IV in the original guideline document) provides details about the inclusion and exclusion of these studies.

2014 Reaffirmation

The 2009 guideline is based on a systematic review of published studies on the treatment of osteoarthritis of the glenohumeral joint in adults.

To reaffirm currency the PubMed, Cochrane Library, and EMBASE databases were searched using the following search terms: "glenohumeral arthritis"[tw] OR ((shoulder*[tiab] OR "Shoulder Joint"[mh] OR glenohumer*[tw]) AND (Osteoarthritis[mh:noexp] OR osteoarthritis*[tiab] OR

Arthritis[mh:noexp] OR (arthriti*[tiab] AND (degenerat*[tiab] OR erosion[tiab] OR eroded[tiab])) OR "Arthroplasty, Replacement"[mh:noexp] OR arthroplasty[tiab] OR "Joint Prosthesis"[mh:noexp] OR "Prostheses and Implants"[mh:noexp] OR resurfac*[tiab] OR hemiarthroplasty[tiab])) NOT (("Shoulder Fractures"[majr] OR "Rotator Cuff Injuries"[majr] OR fractur*[ti] OR injur*[ti]) NOT (arthrit*[tw] OR osteoarthritis*[tw] OR periprosthetic[tiab] OR "Prosthesis Failure"[mh] OR "Postoperative Complications"[mh])). The date range for all searches was 12/08/2008 to 11/07/2013 and the searches were performed on 11/07/2013.

Number of Source Documents

15 articles were included.

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Levels of Evidence for Primary Research Question¹

Types of Studies				
	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	Economic and Decision Analyses Developing an economic or decision model
Level I	<ul style="list-style-type: none"> High quality randomized trial with statistically significant difference or no statistically significant difference but narrow confidence intervals Systematic review² of Level I randomized controlled trials (RCTs) (and study results were homogenous³) 	<ul style="list-style-type: none"> High quality prospective study⁴ (all patients were enrolled at the same point in their disease with ≥80% follow-up of enrolled patients) Systematic review² of Level I studies 	<ul style="list-style-type: none"> Testing of previously developed diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) Systematic review² of Level I studies 	<ul style="list-style-type: none"> Sensible costs and alternatives; values obtained from many studies; with multiway sensitivity analyses Systematic review² of Level I studies
Level II	<ul style="list-style-type: none"> Lesser quality RCT (e.g., <80% follow-up, no blinding, or improper randomization) Prospective⁴ comparative study⁵ Systematic review² of Level II studies or Level I studies with inconsistent results 	<ul style="list-style-type: none"> Retrospective study⁶ Untreated controls from an RCT Lesser quality prospective study (e.g., patients enrolled at different points in their disease or <80% follow-up) Systematic review² of Level II studies 	<ul style="list-style-type: none"> Development of diagnostic criteria on consecutive patients (with universally applied reference "gold" standard) Systematic review² of Level II studies 	<ul style="list-style-type: none"> Sensible costs and alternatives; values obtained from limited studies; with multiway sensitivity analyses Systematic review² of Level II studies
Level III	<ul style="list-style-type: none"> Case control study⁷ Retrospective⁶ comparative study⁵ Systematic review² of Level III studies 	<ul style="list-style-type: none"> Case control study⁷ 	<ul style="list-style-type: none"> Study of nonconsecutive patients; without consistently applied reference "gold" standard Systematic review² of Level III studies 	<ul style="list-style-type: none"> Analyses based on limited alternatives and costs; and poor estimates Systematic review² of Level III studies

Level	• Case series ⁸	• Case series	Types of Studies	• Case-control study	• Analyses with no
IV	Therapeutic Studies Investigating the results of treatment	Prognostic Studies Investigating the effects of a patient characteristic on the outcome of disease	Diagnostic Studies Investigating a diagnostic test	• Poor reference standard	sensitivity analyses Economic and Decision Analyses
Level V	Expert opinion	Expert opinion	Expert opinion	Expert opinion	Developing an economic or decision model

¹ A complete assessment of quality of individual studies requires critical appraisal of all aspects of the study design.

² A combination of results from two or more prior studies.

³ Studies provided consistent results.

⁴ Study was started before the first patient enrolled.

⁵ Patients treated one way (e.g., cemented hip arthroplasty) compared with a group of patients treated in another way (e.g., uncemented hip arthroplasty) at the same institution.

⁶ The study was started after the first patient enrolled.

⁷ Patients identified for the study based on their outcome, called "cases"; e.g., failed total hip arthroplasty, are compared to those who did not have outcome, called "controls"; e.g., successful total hip arthroplasty.

⁸ Patients treated one way with no comparison group of patients treated in another way.

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Data Extraction

Data elements extracted from studies were defined in consultation with the physician work group. Three analysts completed data extraction independently for all studies. The work group audited the evidence tables. Disagreements about the accuracy of extracted data were resolved by consensus and consulting the work group. The elements extracted are shown in Appendix V in the original guideline document.

The American Academy of Orthopaedic Surgeons (AAOS) Guidelines Unit constructed evidence tables to summarize the best evidence pertaining to each preliminary recommendation. These tables are available as a supplemental document available on the AAOS website (<http://www.aaos.org/research/research.asp> [redacted]). These evidence tables include complete lists of included and excluded articles, quality and design parameters of the included studies, and raw data extracted from the included studies.

Judging the Quality of Evidence

The work group assessed the quality of the evidence for each outcome at each time point reported in a study. They did not simply assess the overall quality of a study. This approach follows the recommendations of the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) working group as well as others.

The work group evaluated quality on a per outcome basis rather than a per study basis because quality is not necessarily the same for all outcomes and all follow-up times reported in a study. For example, a study might report results immediately after patients received a given treatment and after some period of time has passed. Often, nearly all enrolled patients contribute data at early follow-up times but, at much later follow-up times, only a few patients may contribute data. One has more confidence in the earlier data than in the later data. The fact that the work group would assign a higher quality score to the earlier results reflects this difference in confidence.

The work group assessed the quality using a two step process. First, they assigned a Level of Evidence to all results reported in a study based solely on that study's design. Accordingly, all data presented in randomized controlled trials were initially categorized as Level I evidence, all results presented in non-randomized controlled trials and other prospective comparative studies were initially categorized as Level II, all results presented in retrospective comparative and case-control studies were initially categorized as Level III, and all results presented in case-series reports were initially categorized as Level IV (see Appendix VI in the original guideline document). The work group next assessed each outcome at each reported time point using a quality questionnaire and, when quality standards were not met, downgraded the Level of evidence (for this outcome at this time point) by one Level (see Appendix VI of the original guideline document).

Assigning a Level of Evidence on the basis of study design plus other quality characteristics ties the Levels of Evidence reported more closely to quality than Levels of Evidence based only on study design. Because the work group ties quality to Levels of Evidence, they are able to

characterize the confidence one can have in their results. Accordingly, they characterize the confidence one can have in Level I evidence as high, the confidence one can have in Level II and III evidence as moderate, and the confidence one can have in Level IV and V evidence as low.

Statistical Methods

When possible the work group reports the results of the statistical analyses conducted by the authors of the included studies. In some circumstances, statistical testing was not conducted; however, the authors reported sufficient quantitative data, including measures of dispersion or patient level data for statistical testing. In these circumstances the work group used the statistical program STATA (StatCorp LP, College Station, Texas) to conduct their own analysis to interpret the results of a study. P-values <0.05 were considered statistically significant. When a statistical analysis was conducted, they noted if the analysis was that of the study authors or their own.

STATA was also used to determine 95% confidence intervals, using the method of Wilson, when authors of the included studies reported counts or proportions. The program was also used to determine the magnitude of the treatment effect. For data reported as means (and associated measures of dispersion) the work group calculated a standardized mean difference by the method of Hedges and Olkin. For proportions, the work group calculated the odds ratio as a measure of treatment effect.

G*Power 3 (Franz Faul, Universitat Kiel, Germany) was used to determine if a study was sufficiently powered to detect the minimal clinically important improvement (MCII). In power calculations, the work group used 80% power, 95% confidence intervals, and the number of patients per group. This allowed calculation of the minimal detectable effect size which was compared to the MCII effect size to determine if the study had enough power to detect the MCII.

Methods Used to Formulate the Recommendations

Expert Consensus (Nominal Group Technique)

Description of Methods Used to Formulate the Recommendations

An American Academy of Orthopaedic Surgeons (AAOS) Glenohumeral Osteoarthritis Physician Work Group prepared this guideline and the underlying systematic reviews with the assistance of the AAOS Clinical Practice Guidelines Unit (see Appendix I in the original guideline document) in the Department of Research and Scientific Affairs at the AAOS.

To develop the guideline, the work group met at an introductory meeting on November 22, 2008 to establish the scope of the guideline. Upon completion of the systematic review, the work group met again on June 27 and 28, 2009 to write and vote on the final recommendations and rationales for each recommendation.

Formulating Preliminary Recommendations

The work group began work on this guideline by constructing a set of preliminary recommendations. These recommendations specify [what] should be done in [whom], [when], [where], and [how often or how long]. They function as questions for the systematic review, not as final recommendations or conclusions. Preliminary recommendations are almost always modified on the basis of the results of the systematic review. Once established, these *a priori* preliminary recommendations cannot be modified until the final work group meeting, they must be addressed by the systematic review, and the relevant review results must be presented in the final guideline.

Defining the Strength of the Recommendations

AAOS staff first assigned a preliminary strength rating for each recommendation that took only the quality and quantity of the available evidence into account (see "Rating Scheme for the Strength of the Recommendations" field). Work group members then modified the preliminary strength rating using the 'Form for Assigning Grade of Recommendation (Interventions)' shown in Appendix VII of the original guideline document. This form is based on recommendations of the GRADE Work Group and requires the work group to consider the harms, benefits, and critical outcomes associated with a treatment. It also requires the work group to evaluate the applicability of the evidence. The final strength of the recommendation is assigned by the physician work group, which modifies the preliminary grade on the basis of these considerations.

Consensus Development

Work group members voted on each recommendation and its strength using a structured voting technique that was a modification of the Nominal Group Technique (see Appendix VIII in the original guideline document), a method previously used in guideline development. Voting on guideline recommendations was conducted by secret ballot. Briefly each member of the guideline work group ranks his or her agreement with a guideline

recommendation or performance measure on a scale ranging from 1 to 9 (where 1 is "extremely inappropriate" and 9 is "extremely appropriate"). Consensus is obtained if the number of individuals who do not rate a measure as 7, 8, or 9 is statistically non-significant (as determined using the binomial distribution). Because the number of work group members who are allowed to dissent with the recommendation depends on statistical significance, the number of permissible dissenters varies with the size of the work group. If disagreements were not resolved after three voting rounds, no recommendation was adopted. Lack of agreement can be a reason that the strength of some recommendations may be labeled as "Inconclusive."

For this guideline, the work group resolved all disagreements within three voting rounds and no recommendations were graded as "inconclusive" because of lack of agreement within the work group. Two consensus based recommendations were issued following the rules outlined in Appendix VIII in the original guideline document.

2014 Reaffirmation

After review of the updated 2008-2013 literature, the AAOS determined that no changes were required.

Rating Scheme for the Strength of the Recommendations

Strength of Recommendation

Strength	Overall Quality of Evidence	Description of Evidence	Guideline Language
Strong	Good	Level I evidence from more than one study with consistent findings for recommending for or against the intervention or diagnostic.	The work group <i>recommends</i>
Moderate	Fair	Level II or III evidence from more than one study with consistent findings, or Level I evidence from a single study for recommending for or against the intervention or diagnostic.	The work group <i>suggests</i>
Weak	Poor	Level IV or V evidence from more than one study with consistent findings, or Level II or III evidence from a single study for recommending for against the intervention or diagnostic.	<i>option</i>
Inconclusive	None or conflicting	The evidence is insufficient or conflicting and does not allow a recommendation for or against the intervention or diagnostic.	The work group is <i>unable to recommend for or against</i>
Consensus	No evidence	There is no supporting evidence. In the absence of reliable evidence, the work group is making a recommendation based on their clinical opinion considering the known harms and benefits associated with the treatment.	In the absence of reliable evidence, it is the <i>opinion</i> of the work group

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Peer Review

The draft of the guideline and evidence report were peer reviewed by outside specialty organizations that were nominated by the physician work group prior to the development of the guideline. Peer review was accomplished using a structured peer review form (see Appendix IX in the

original guideline document).

In addition, the physician members of the American Academy of Orthopaedic Surgeons (AAOS) Guidelines and Technology Oversight Committee, the Evidence Based Practice Committee and the Chairpersons of the AAOS Occupational Health and Workers' Compensation Committee and the Medical Liability Committee were given the opportunity to provide peer review of the draft document.

The work group forwarded the draft guideline to a total of 34 peer reviewers and 17 returned reviews. The disposition of all non-editorial peer review comments was documented and the guideline was modified in response to peer review. The peer reviews and the responses to them accompanied this guideline through the process of public commentary and the subsequent approval process. Peer reviewing organizations and peer reviewing individuals are listed in this document if they explicitly agree to allow them to publish this information (see Appendix X in the original guideline document).

Public Commentary

After modifying the draft in response to peer review, the guideline was submitted for a thirty-day period of "Public Commentary." Commentators consist of members of the AAOS Board of Directors (BOD), members of the Council on Research, Quality Assessment, and Technology (CORQAT), members of the Board of Councilors (BOC), and members of the Board of Specialty Societies (BOS). Based on these bodies, up to 185 commentators had the opportunity to provide input into the development of this guideline. Of these, one member returned public comments.

The AAOS Guideline Approval Process

In response to the non-editorial comments submitted during the period of public commentary, the draft was again modified by the AAOS Clinical Practice Guidelines Unit and physician work group members. The AAOS Guidelines and Technology Oversight Committee, the AAOS Evidence-based Practice Committee, the AAOS Council on Research, Quality Assessment, and Technology, and the AAOS Board of Directors approved the final guideline draft. Descriptions of these bodies are provided in Appendix II in the original guideline document.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is specifically stated for each recommendation (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate treatment of glenohumeral joint arthritis to enable pain relief, improved functional status, and improved quality of life

Potential Harms

- Most treatments are associated with some known risks, especially invasive and operative treatments. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.
- Common adverse events associated with operative treatments are:
 - Intraoperative fracture
 - Infection
 - Venous thromboembolism
 - Pulmonary embolism

Contraindications

Contraindications

Contraindications vary widely based on the treatment administered. Therefore, discussion of available treatments and procedures applicable to the individual patient rely on mutual communication between the patient and physician, weighing the potential risks and benefits for that patient.

Qualifying Statements

Qualifying Statements

- This Clinical Practice Guideline was developed by an American Academy of Orthopaedic Surgeons (AAOS) physician volunteer Work Group based on a systematic review of the current scientific and clinical information and accepted approaches to treatment and/or diagnosis. This Clinical Practice Guideline is not intended to be a fixed protocol, as some patients may require more or less treatment or different means of diagnosis. Clinical patients may not necessarily be the same as those found in a clinical trial. Patient care and treatment should always be based on a clinician's independent medical judgment, given the individual patient's clinical circumstances.
- Some drugs or medical devices referenced or described in this Clinical Practice Guideline may not have been cleared by the U.S. Food and Drug Administration (FDA) or may have been cleared for a specific use only. The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or device he or she wishes to use in clinical practice.
- This summary of recommendations is not intended to stand alone. Treatment decisions should be made in light of all circumstances presented by the patient. Treatments and procedures applicable to the individual patient rely on mutual communication between patient, physician and other healthcare practitioners.
- This guideline should not be construed as including all proper methods of care or excluding methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding any specific procedure or treatment must be made in light of all circumstances presented by the patient and the needs and resources particular to the locality or institution.

Implementation of the Guideline

Description of Implementation Strategy

Guideline Dissemination Plans

The guideline document is also posted on the American Academy of Orthopaedic Surgeons (AAOS) website at <http://www.aaos.org/research/guidelines/guide.asp> .

Shorter versions of the guideline are available in other venues. Publication of most guidelines is announced by an Academy press release, articles authored by the work group and published in the Journal of the American Academy of Orthopaedic Surgeons, and articles published in AAOS Now. Most guidelines are also distributed at the AAOS Annual Meeting in various venues such as on Academy Row and at Committee Scientific Exhibits.

Selected guidelines are disseminated by webinar, an Online Module for the Orthopaedic Knowledge Online website, Radio Media Tours, Media Briefings, and by distributing them at relevant Continuing Medical Education (CME) courses and at the AAOS Resource Center.

Other dissemination efforts outside the AAOS include submitting the guideline to the National Guideline Clearinghouse and distributing the guideline at other medical specialty societies' meetings.

Implementation Tools

Patient Resources

Quick Reference Guides/Physician Guides

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

American Academy of Orthopaedic Surgeons (AAOS). American Academy of Orthopaedic Surgeons clinical practice guideline on the treatment of glenohumeral joint osteoarthritis. Rosemont (IL): American Academy of Orthopaedic Surgeons (AAOS); 2009 Dec 4. 198 p. [31 references]

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2009 Dec 4 (reaffirmed 2014)

Guideline Developer(s)

American Academy of Orthopaedic Surgeons - Medical Specialty Society

Source(s) of Funding

This Clinical Practice Guideline was funded exclusively by the American Academy of Orthopaedic Surgeons who received no funding from outside commercial sources to support the development of this document.

Guideline Committee

This guideline and the underlying systematic reviews were prepared by an American Academy of Orthopaedic Surgeons (AAOS) Glenohumeral Osteoarthritis Physician Work Group, with the assistance of the AAOS Clinical Practice Guidelines Unit in the Department of Research and Scientific Affairs at the AAOS.

Composition of Group That Authored the Guideline

Work Group: Rolando Izquierdo, MD (*Chair*), Crystal Lake Orthopaedic Surgery and Sports Medicine, Crystal Lake, IL; Ilya Voloshin, MD (*Vice-Chair*), University of Rochester Medical Center, Rochester, NY; Sara Edwards, MD, San Francisco CA; Michael Q. Freehill, MD, Edina, MN; Walter Stanwood, MD, Duxbury, MA; J. Michael Wiater, MD, Beverly Hills Orthopaedic Surgery, Beverly Hills, MI

Guidelines and Technology Oversight Chair: William C. Watters III, MD, Houston, TX

Guidelines and Technology Oversight Vice-Chair: Michael J. Goldberg, MD, Department of Orthopaedics, Seattle Children's Hospital, Seattle, WA

Evidence Based Practice Committee Chair: Michael Keith, MD, Cleveland, OH

AAOS Staff: Charles M. Turkelson, PhD, Director of Research and Scientific Affairs, Rosemont, IL; Janet L. Wies, MPH, AAOS Clinical Practice Guideline Manager; Sara Anderson, MPH – Lead Analyst; Kevin Boyer; Laura Raymond, MA; Patrick Sluka, MPH

Financial Disclosures/Conflicts of Interest

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Disclosure Items: (n) = Respondent answered 'No' to all items indicating no conflicts. 1 = Board member/owner/officer/committee appointments; 2 = Medical/orthopaedic publications; 3 = Royalties; 4 = Speakers bureau/paid presentations; 5A = Paid consultant; 5B = Unpaid consultant; 6 = Research or institutional support from a publisher; 7 = Research or institutional support from a company or supplier; 8 = stock or stock options; 9 = Other financial/material support from a publisher; 10 = Other financial/material support from a company or supplier.

Sara Edwards, MD (San Francisco, CA): (n). Submitted on: 10/14/2008.

Michael Q Freehill, MD (Edina, MN): 4 (Zimmer); 5A (Zimmer). Submitted on: 10/06/2008 at 03:12 PM.

Michael J Goldberg, MD: 2 (Journal of Pediatric Orthopedics; Journal of Children's Orthopaedics). Submitted on: 12/11/2007.

Rolando Izquierdo, MD (Crystal Lake, IL): 1 (Algonquin Road Surgery Center). Submitted on: 06/23/2008.

Michael Warren Keith, MD: (n). Submitted on: 10/10/2007 at 08:42 AM and last confirmed as accurate on 04/09/2008.

Walter Stanwood, MD (Duxbury, MA): 1 (Surgisouth, LLC); 5A (Arthrocare). Submitted on: 10/22/2008 at 03:44 PM.

Ilya Voloshin, MD (Rochester, NY): 5A (Arthrocare); 7 (Arthrex, Inc). Submitted on: 10/13/2008.

William Charles Watters III, MD: 1 (North American Spine Society; Work Loss Data Institute); 2 (The Spine Journal); 5A (Stryker; Intrinsic Therapeutics; McKesson Health Care Solutions). Submitted on: 10/09/2007 at 08:09 PM and last confirmed as accurate on 04/23/2008.

J Michael Wiater, MD (Beverly Hills, MI): 1 (American Shoulder and Elbow Surgeons; Michigan Orthopaedic Society); 2 (Journal of Bone and Joint Surgery - American; Journal of Shoulder and Elbow Surgery; Journal of the American Academy of Orthopedic Surgeons); 5A (Zimmer; American Academy of Orthopaedic Surgeons; Corather's Health Consulting, LLC); 7 (American Shoulder and Elbow Surgeons; William Beaumont Hospital Research Institute). Submitted on: 10/16/2008.

Guideline Status

This is the current release of the guideline.

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Availability of Companion Documents

The following are available:

- The treatment of glenohumeral joint osteoarthritis. Summary of recommendations. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2009 Dec. 3 p. Electronic copies: Available from the [American Academy of Orthopaedic Surgeons \(AAOS\) Web site](#) .
- The treatment of glenohumeral joint osteoarthritis. Evidence tables. Rosemont (IL): American Academy of Orthopaedic Surgeons; 2009. 62 p. Electronic copies: Available from the [AAOS Web site](#) .

Print copies: Available from the American Academy of Orthopaedic Surgeons, 6300 North River Road, Rosemont, IL 60018-4262. Telephone: (800) 626-6726 (800 346-AAOS); Fax: (847) 823-8125; Web site: www.aaos.org .

The following is also available:

- Crosby LA. Osteoarthritis of the glenohumeral joint. Orthopaedic Knowledge Online (OKO). Rosemont (IL): American Academy of Orthopaedic Surgeons. Electronic copies: Available to subscribers from the [AAOS Web site](#) .

Patient Resources

The following are available:

- Arthritis of the shoulder. 2007 Jul. Electronic copies: Available from the [American Academy of Orthopaedic Surgeons \(AAOS\) Web site](#) .
- Osteoarthritis. 2007 Jul. Electronic copies: Available from the [AAOS Web site](#) .
- A patient's experience with osteoarthritis of the shoulder. Patient stories. 2006 Jun. Electronic copies: Available from the [AAOS Web site](#) .

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